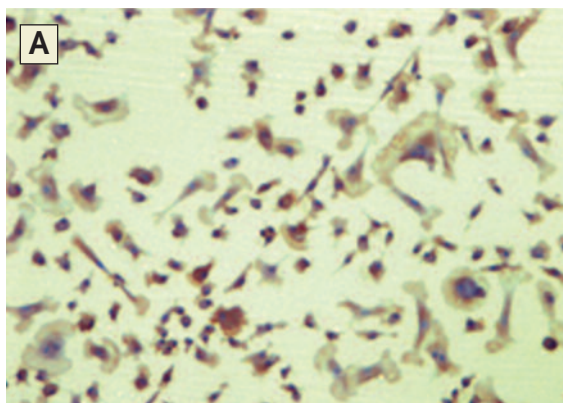
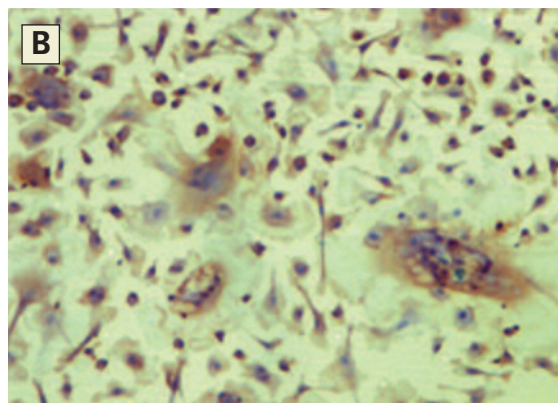


Graphic Evidence

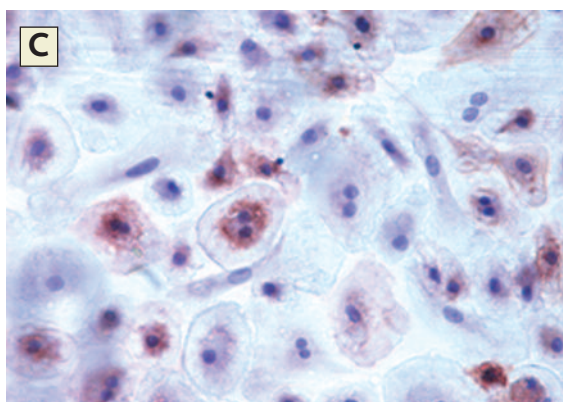
COCAINE MAY INCREASE RISK FOR COGNITIVE PROBLEMS IN HIV



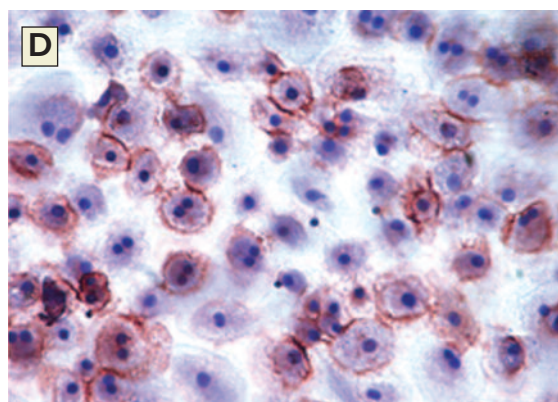
Control



Cocaine, 1 μM



Control



Cocaine, 1 μM

Improved antiviral medications have rendered less common the severe cognitive losses that were a dreaded complication of HIV infection early in the epidemic. Nevertheless, HIV continues to cause pathology in brain tissues, and some patients still cope with mild or moderate cognitive impairments. Photomicrographs from recent experiments demonstrate that cocaine promotes two processes that have been linked to abnormal brain function in patients infected with HIV: viral replication in white blood cells and macrophage activation.

HIV infiltrates the brain inside white blood cells. Once in the brain, the virus may remain dormant or replicate. The faster the virus replicates, the more likely it is to incite inflammation, which can disrupt normal brain cell functioning. Drs. Shilpa J. Buch, Navneet K. Dhillon, and colleagues at the University of Kansas Medical Cen-

ter showed that cocaine accelerates viral replication. The researchers exposed two laboratory cultures of macrophages, a key white blood cell type, to HIV (A and B); they also exposed one of the cultures (B) to cocaine (1 μM). The virus replicated up to eight times faster in the drug-exposed than in the unexposed macrophages. After 48 hours, rapid HIV replication had caused the drug-exposed macrophages to swell and become distended (B).

Macrophages are sentinels and first-line defenders in the immune system. When activated by viral, bacterial, or other challenges, they release chemicals to attack the invading organisms. These chemicals can be toxic to healthy brain cells, and studies have linked macrophage activation to impaired cognitive performance by people infected with HIV. The Kansas team showed that cocaine independently enhances macrophage activation

as much as twofold. The researchers prepared two virus-free macrophage cultures (C and D), exposed one (D) to the drug (1 μM), and then tested both with a red stain that attaches to a cellular product of macrophage activation (human leukocyte antigen-DR). The stain revealed much more of the activation product in the drug-exposed culture (D).

Results from *in vitro* studies do not always reflect what happens in living people. Nevertheless, these findings suggest that cocaine may add to the risk for cognitive deficits in patients infected with HIV.

Source: Dhillon, N.K., et al., 2007. Cocaine-mediated enhancement of virus replication in macrophages: Implications for human immunodeficiency virus-associated dementia. *Journal of NeuroVirology* 13(6):483-495.